Effect of LED (Light emitting diode) on Development of Fruit Body in Bottle Cultivation Mushrooms

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Recently, the study of Light Emitting Diode for agricultural adaptation has begun as a useful light source of saving-energy.

At first, we aim to elucidate suitable color of LED during development of fruit body in Pleurotus ostreatus, Pleurotus eryngii, Hypsizygus marmoreus. The four color of LED(Light Emitting Diode), blue LED(475nm), green LED(525nm), yellowed LED(590nm), and red LED(660nm), were irradiated for formation of fruit body. In Pleurotus eryngii, we could obtain the highest number of available stipes and biological efficiency and ergosterol content of fruit body by green LED in (1). In case of Pleurotus ostreatus and Hypsizygus marmoreus, we could obtain the highest commercial yields and ergosterol content of fruit body at the blue LED(2).

Second, we try to find suitable mixed color of LED light during development of fruit body in Pleurotus ostreatus and Hypsizygus marmoreus. The five mixed color of LED, blue and white, green and white, blue and red, blue and green and green and red LED, were irradiated for formation of fruit-body. As results of mixed color of LED for all growth stage, the properties of fruit body of Pleurotus ostreatus and Hypsizygus marmoreus in blue and white mixed LED irradiation were showed higher commercial yields and lower ratio of breakage in fruit body than those in fluorescent lamp. And the content of ergosterol and ergothioneine were the highest at the mixed color LED radiation than any other LED(3).

Third, we investigated the appropriate LED intensity for the growth of the oyster mushroom. Larger pileus and shorter stipe were resulted in according to increasing LED intensity. And lower LED intensity, below 1umol/m²/s, was brought more the number of available stipe and higher yield of fruit body(4).

In previous studies, we selected a suitable mixture of different colored LED during development of fruit body in P. ostreatus. Consequently, we aim to analyze electricity usage for control of growing environments according to light type. There were no big differences temperature and relative humidity among light type. However, temperature of pileus surface below incandescent light bulb showed 1.0~1.5°C higher than that of LED and fluorescent lamps. The CO₂ content below LED lamp until 26hr is lower than any other lamps. As a result of electricity usage analysis, total electricity usage of LED is the lowest among other lamps because electricity amount of lamp is the lowest. In this result, we made cultural experiment during cold season. Consequently, it is necessary to assay about relationship with environmental factors and fruit body growing characteristics for all the year round.

References

Keywords: fruit body, Hypsizygus marmoreus, light emitting diode, Pleurotus eryngii, Pleurotus ostreatus